

MEMO FOR RECORD

FROM: Andrew Tuthill, ERCC-CRREL-NH

SUBJECT: Freezeup Ice Jam Flooding in Malone, NY.

DATE: January 21, 2004

Andy Tuthill traveled to Malone, NY on January 19, 2004 to assess an ice jam flood situation on the Salmon River downstream of the village of Malone, NY. The trip was made at the request of Emergency Management of the Buffalo District of the Corps of Engineers. Guenther Frankenstein (Chief, Ice Engineering-CRREL, retired) accompanied Tuthill on the visit. At 11:00, we met with Malcolm Jones, Director of Franklin County Emergency Services (518-483-2580) and Donald Dumas, Town of Malone Councilman (518-483-1860) who described the problem and its history. Both are long-term area residents.

A freezeup ice jam had formed upstream of Lamica Lake, the 14-acre pool formed by the Macomb Hydroelectric Project (Fig. 1). Frazil ice, deposited in the dam impoundment and the river channel upstream, had forced flow into the right overbank, flooding seven houses on the west side of Lower Park Road (Figs. 2, 3 and 4). Six of these houses had been evacuated and three were completely surrounded by water. Town crews had constructed berms of earth snow to protect houses on the east side of the road. The ice jam had formed as the result of the extreme cold of January 8-16. Fig. 5 shows air temperatures during this period to be well below the seasonal averages. By Jan. 19, stages had receded slightly due to the more moderate temperatures of Jan. 17-18.

On midday on Jan. 19th air temperature was about 10°F and the 2-mile-long reach between Malone village and the flooded area was fast flowing open water with border ice but, no evidence moving frazil or anchor ice (Fig. 6). During the previous sub-zero period however, Jones and Dumas had observed heavy frazil ice moving through this reach. Above the two dams in Malone village, the Salmon River was again ice covered suggesting that most of the frazil ice in the Lower Park Rd. jam was generated in the open water section downstream of the city.

The Macomb Project, operated by Reliant Energy, consists of a 27-ft-high dam built in 1899 and a powerhouse with single 1000 MW turbine (Fig. 7). Allowable drawdown is 1.0 ft, and turbine capacity is 310 cfs. Any flow in excess of 310 cfs passes the dam spillway, which has no flashboards. On Jan. 19th, Salmon River discharge 7 miles upstream at the Chasm Falls Project was 147 cfs, well below the Macomb average January discharge of 271 cfs. During our visit, a crew was in the process of deicing the trashracks at the Macomb Project, and, as a result of this blockage, some flow was passing the spillway.

Both Jones and Dumas commented the amount of sediment that has deposited in Lamica Lake during the last 30-40 years. The Lake, which used to be at least 20-ft-deep and good fishing, is now much shallower, and the islands upstream and downstream of the Cady Road Bridge have grown considerably. They could not recall if the lake bed or river channel upstream had been dredged in the past. The deposition they said was

exacerbated by a major upstream sediment release event that occurred about 7-years-ago (this may have been during the April 1, 1998 flood of record, which produced a daily average flow at Chazm Falls of 3280 cfs). In any case, the sedimentation appears to limit the lake's frazil ice storage capacity, possibly displacing the freezeup ice jam problem upstream.

Jones and Dumas are extremely interested in finding a long-term solution to the sedimentation and ice jam flood problems. The changes in the channel morphology were difficult to see on Jan. 19th, due to the ice and snow cover, and a field visit during the spring or summer would be beneficial in this regard. Some research on channel changes and past dredging activities might also be useful in understanding the current ice jam flood problem.

By Jan. 21, Malcolm Jones reported that water levels had dropped sufficiently to re-open the road and begin pumping out the basements of the flooded houses. Hopefully the extreme cold forecast for the next few days will not cause renewed flooding.

Respectfully Submitted,

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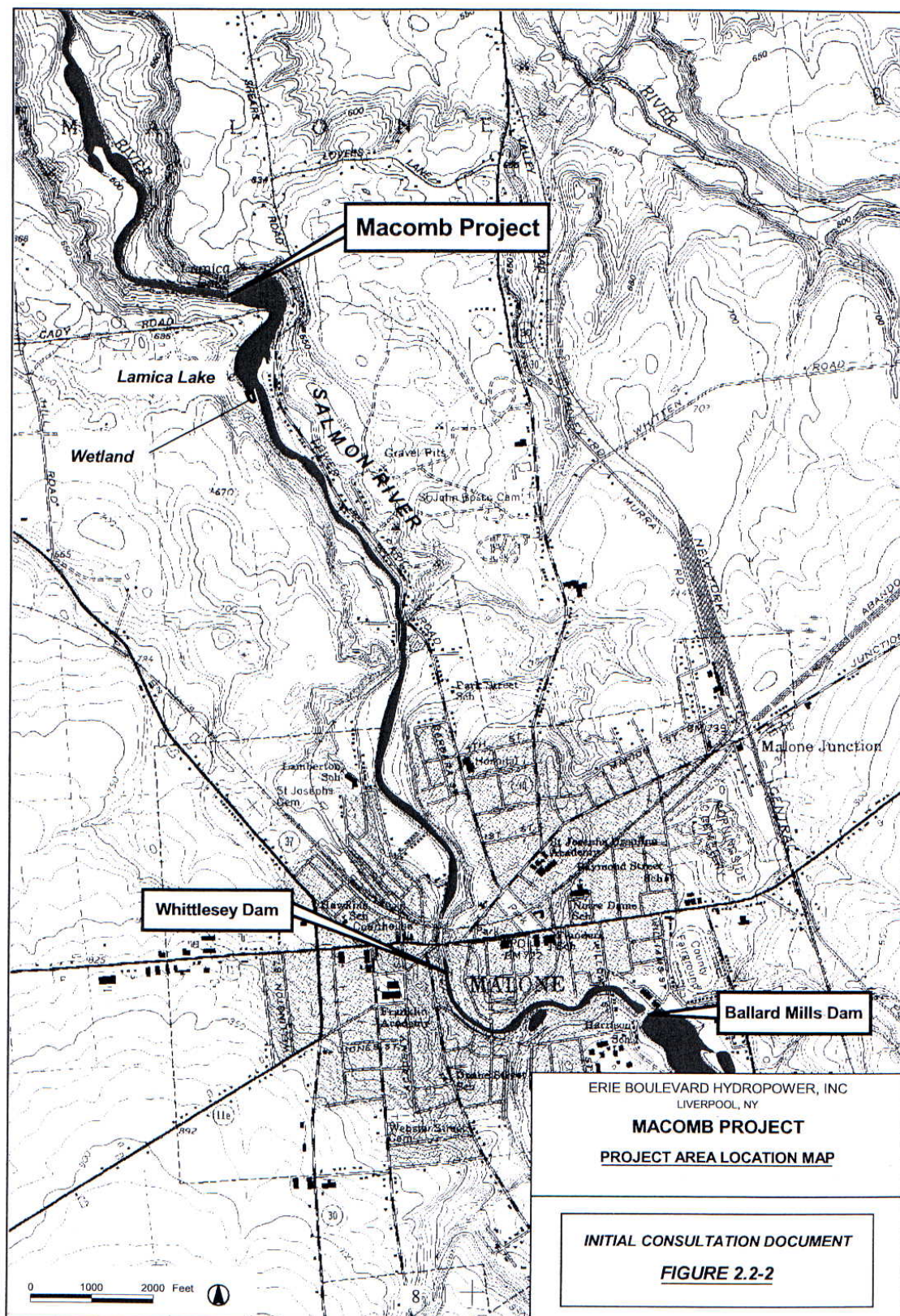


Fig. 1. Salmon River downstream of Malone, NY. The ice jam formed at the upstream end of Lamica Lake, flooding houses along Lower Park Rd.

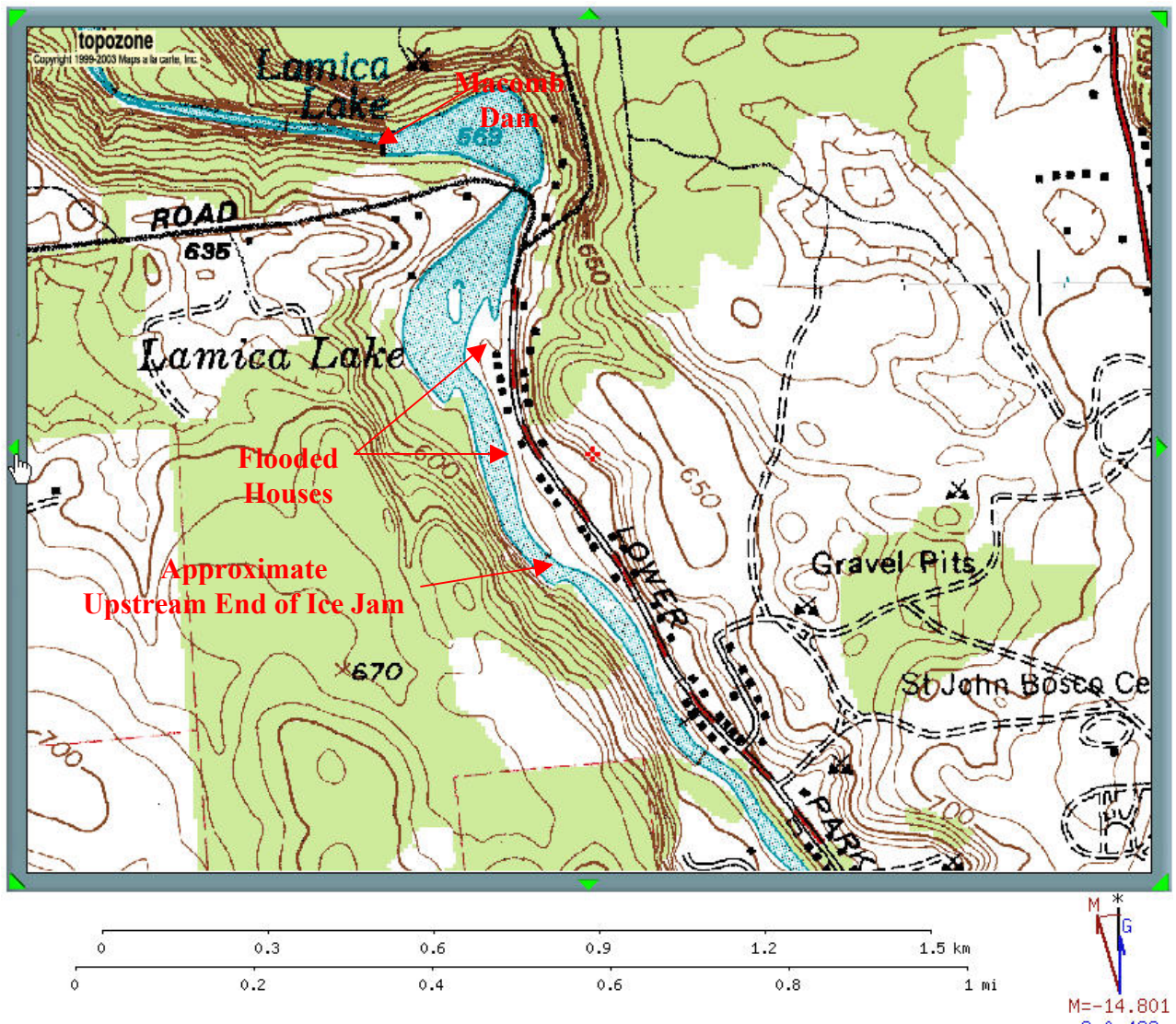


Fig. 2. Lamica Lake and ice jam flood location.



Fig. 3. Lower Park Rd. Flooded houses are on the left.



Fig. 4. Looking west from Lower Park Rd. In the distance, the ice jam in the main channel has forced flow out of bank in the foreground. Note the well house roof protruding above the water and ice near the center of the photo.

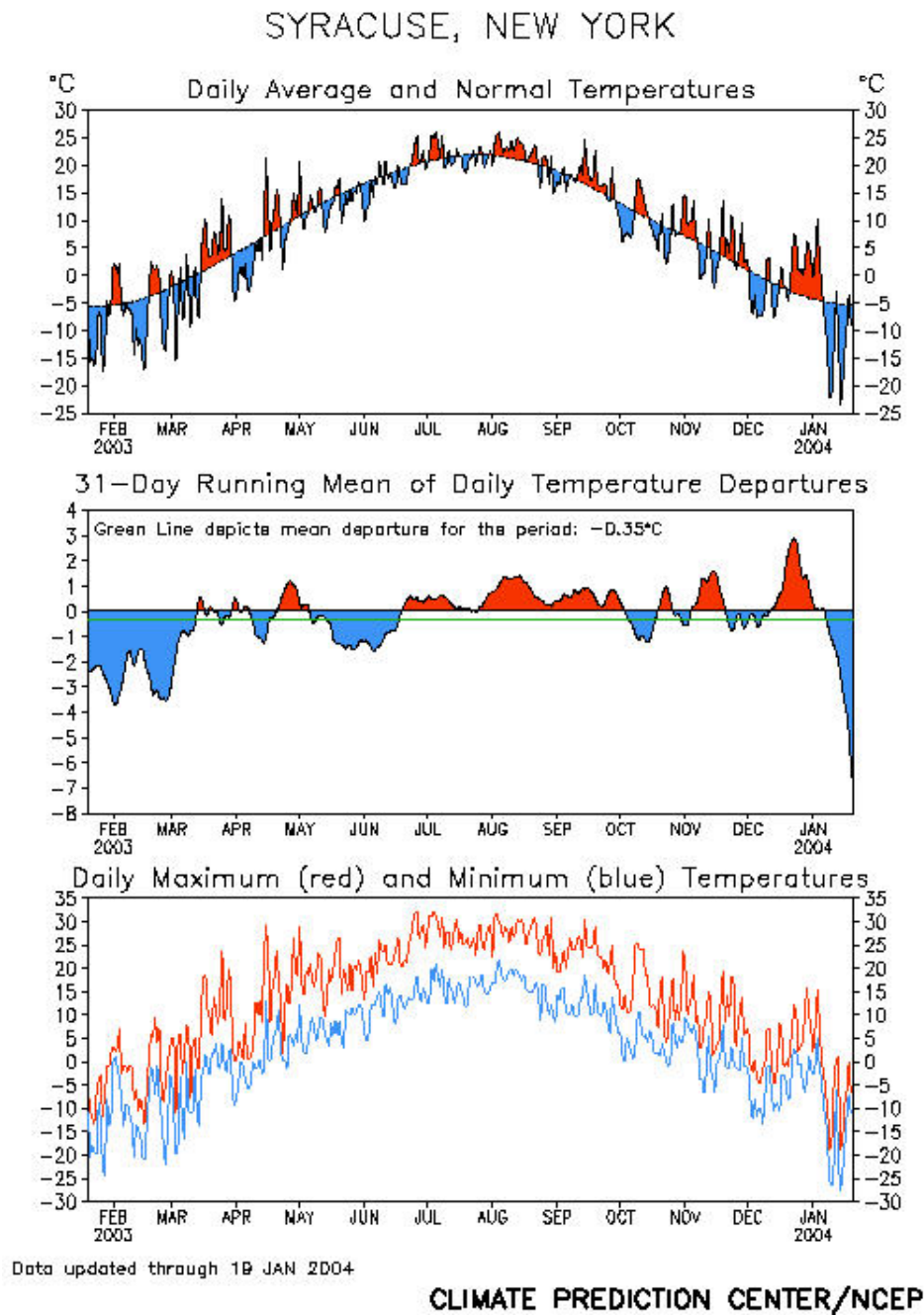


Fig. 5. Recent air temperatures at Syracuse, NY compared to long term averages.



Fig. 6. Open water reach between Malone Village and Lower Park Rd.



Fig. 7. Macomb Project.